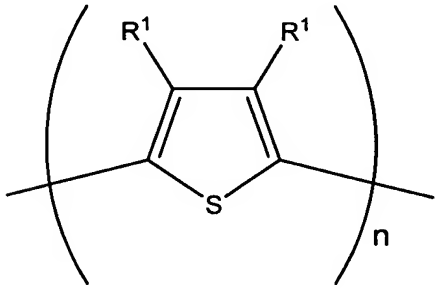
CLAIMS

What is claimed is:

1. A composite comprising a first layer comprising at least one doped conductive polymer and a second layer comprising a material selected from a colloid-forming polymeric acid, a salt of a colloid-forming polymeric acid, a non-polymeric fluorinated organic acid, and a salt of a non-polymeric fluorinated organic acid.

2. A composite according to Claim 1, wherein the conductive polymer is selected from polythiophenes, polypyrroles, polyanilines, and combinations thereof.

3. A composite according to Claim 2, wherein the polythiophene comprises Formula I:



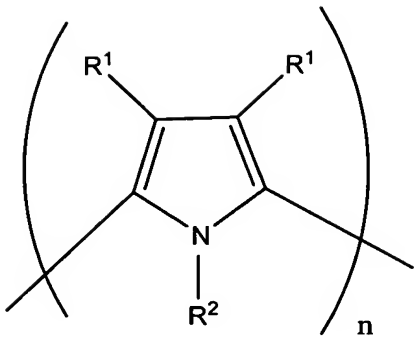
(I)

wherein:

R^1 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, alkoxy, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, and urethane; or both R^1 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms, and

n is at least about 4.

4. A composite according to Claim 2, wherein the polypyrrole comprises Formula II:



(II)

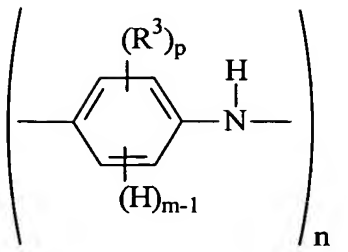
wherein:

n is at least about 4;

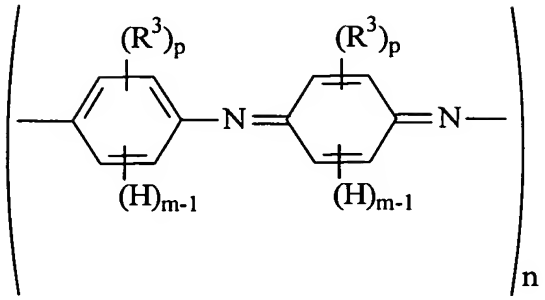
R^1 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, alkoxy, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, and urethane; or both R^1 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms; and

R^2 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, aryl, alkanoyl, alkylthioalkyl, alkylaryl, arylalkyl, amino, epoxy, silane, siloxane, alcohol, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, and urethane.

5. A composite according to Claim 2, wherein the polyaniline comprises Formula III or Formula IV:



(III)



(IV)

wherein:

n is at least about 4;

p is an integer from 0 to 4;

m is an integer from 1 to 5, with the proviso that p + m = 5; and

R^3 is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, carboxylic acid, halogen, cyano, or alkyl substituted with one or more of sulfonic acid, carboxylic acid, halo, nitro, cyano or epoxy moieties; or any two R^3 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms.

6. A composite according to Claim 1, wherein said colloid-forming polymeric acid is selected from polymeric sulfonic acids, polymeric phosphoric acids, polymeric phosphonic acids, polymeric carboxylic acids, polymeric acrylic acids, and mixtures thereof.

7. A composite according to Claim 6, wherein said colloid-forming polymeric acid comprises a fluorinated polymeric sulfonic acid.

8. A composite according to Claim 7, wherein said polymeric sulfonic acid is perfluorinated.

9. A composition according to Claim 1, wherein said non-polymeric fluorinated organic acid is selected from non-polymeric fluorinated sulfonic acids, non-polymeric fluorinated phosphoric acids, non-polymeric fluorinated phosphonic acids, non-polymeric fluorinated carboxylic acids, non-polymeric fluorinated acrylic acids, and mixtures thereof.

10. A composition according to Claim 1, wherein said non-polymeric fluorinated organic acid is selected from fluoroamido organic acids, fluoroamidoether organic acids, fluoroether organic acids, and combinations thereof.

11. A composition according to Claim 9, wherein said non-polymeric fluorinated organic acid is highly fluorinated.

12. A composition according to Claim 9, wherein said non-polymeric organic acid is perfluorinated.

13. A composite according to Claim 9, wherein said second layer comprises a fluoroether sulfonate having Formula V:

$$R^7\text{-}(O\text{-}CF_2CFR_f)_a\text{-}O\text{-}CF_2CFR'_fSO_3X \qquad (V)$$

wherein R^7 is a fluoroalkyl group, Rf and R'f are independently selected from F, Cl or a perfluorinated alkyl group having 1 to 10 carbon atoms, a = 0, 1 or 2, and X is selected from H^+, metal cations, and $N(R1)(R2)(R3)(R4)^+$ where R1, R2, R3, and R4 are the same or different and are selected from H and alkyl.

14. A composite according to Claim 13, wherein R^7 is selected from difluoromethyl and 1,1,2,2-tetrafluoroethyl.

15. A composite according to Claim 13, wherein the second layer comprises a material selected from a non-polymeric fluorosulfonic acid and a salt of the fluorosulfonic acid, wherein the fluorosulfonic acid is selected from 2-(1,1,2,3,3,3-hexafluoro-1-(perfluoroethoxy)propane-2-yloxy)-1,1,2,2-tetrafluoroethanesulfonic acid, 1,1,2,2-tetrafluoro-2-(perfluoroethoxy)ethanesulfonic acid, and 2-(1,1,2,2-tetrafluoroethoxy)-1,1,2,2-tetrafluoroethanesulfonic acid.

16. An electronic device comprising at least one layer comprising a composite according to Claim 1.

17. The device of claim 16 wherein at least one layer comprising the composition of Claim is a buffer layer.

18. A device according to Claim 16, wherein the device is selected a photosensor, photoswitch, light-emitting diode, light-emitting diode display, photodetector, phototransistor, photoconductor, phototube, Infra-Red detector, diode laser, electrochromic device, electromagnetic shielding device, solid electrolyte capacitors, energy storage device, field effect resistance device, memory storage device, biosensor, photoconductive cell, photovoltaic device, solar cell, memory storage, antistatic film, electrochromic, solid electrolyte capacitors, energy storage, electromagnetic shield and diode.

19. A thin film field effect transistor comprising at least one electrode comprising the composition of Claim 1.